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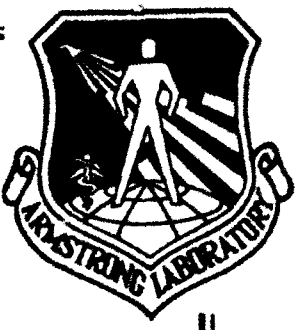

ARMSTRONG LABORATORY

VALIDATION OF MMPI SCALES FOR PERSONALITY DISORDERS: A "PILOT" AND OTHER AVIATOR STUDY

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The voluntary, fully informed consent of the subjects used in this research was obtained as required by AFR 169-6.

The Office of Public Affairs has reviewed this report, and it is releasable to the National Technical Information Service, where it will be available to the general public, including foreign nationals.

This report has been reviewed and is approved for publication.

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The Minnesota Multiphasic Personality Investory (MMPI), long a psychometric staple, has not been readily compatible with the third Diagnostic and Statistical Manual of Mental Disorders (DSM-III and DSM-III-R; 1, 2). Morey, Waugh, and Blashfield (8) rationally/empirically constructed MMPI personality disorder scales to assess these DSM-III Axis II conditions, but adequate outpatient validation remains to be accomplished. The present study, based on 104 male aviators referred to a consultation service, found significant ($p < 0.001$) positive correlations in nine of 11 personality disorder scale comparisons between the MMPI and the Millon Clinical Multiaxial Inventory (MCMI), a test that attempts to more closely correspond to the criterion of the DSM-III/DSM-III-R. The Antisocial and Compulsive personality disorder scales failed to significantly correlate. The MMPI personality disorder scales; however, did not significantly identify which subjects had psychiatrically noted maladaptive personality traits.

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Validation of MMPI Scales for Personality Disorders: A "Pilot" and Other Aviator Study

In recent years, psychiatric nosology and nomenclature have commanded increasing attention. Personality disorders have stimulated particular interest as is reflected in the creation of the multiaxial diagnostic system, specifically Axis II, introduced in the Diagnostic and Statistical Manual of Mental Disorders, DSM-III (1). Personality disorders and maladaptive personality traits pose a diagnostic challenge to the personality assessor. Mental health clinicians often seek additional diagnostic aids to make the fine discriminations required by the DSM-III and its successor, the DSM-III-R (2). To make the Minnesota Multiphasic Personality Inventory (MMPI) more clinically useful to this end, Morey, Waugh, and Blashfield (8) constructed scales for identifying personality disorders based on DSM-III categories. Morey et al., using a rational/empirical approach modeled after Wiggins (9), constructed the following 11 scales: Schizoid (*SZD*), Avoidant (*AVD*), Dependent (*DEP*), Histrionic (*HST*), Narcissistic (*NAR*), Antisocial (*ANT*), Compulsive (*CPS*), Passive-Aggressive (*PAG*), Schizotypal (*STY*), Borderline (*BDL*), and Paranoid (*PAR*). Millon, a member of the DSM-III personality disorders task force, had used parallel DSM-III personality disorder categories (scales *1* through *8*, *S*, *C*, and *P*, respectively) when he constructed the Millon Clinical Multiaxial Inventory (MCMI; 6). The personality disorder scales of the MCMI and the DSM-III/DSM-III-R have been investigated in a previous study (4) with a subset of the present population.

McCann (5) found significant correlations between most corresponding scales when the MMPI personality disorder scales were compared with the MCMI personality disorder scales. McCann, however, noted a need to replicate concurrent validity studies on populations

that are more representative of outpatients rather than psychiatric inpatients and those referred for psychological testing due to the "interesting" (read difficult) nature of their clinical presentation. The present study is an attempt at such a replication; it samples database information from highly functioning, referred patients. This highly functioning sample, however, may not accurately represent the outpatient population. The investigators also report on diagnoses and notations on Axis II independently rendered by psychiatrists (based on diagnostic interviewing, records review, and other clinical information excluding psychological testing) compared with the MMPI personality disorder scales.

Methods

Subjects

One hundred and four pilots, navigators, advanced student pilots, and other aircrew members (known collectively as "aviators") who were referred for psychological and psychiatric assessment as part of an overall evaluation by the U.S. Air Force (USAF) Aeromedical Consultation Service during the period 1988 through 1991 served as the subjects in this retrospective (database) study. Patterson, Sipes, and Marsh (9) report on the composition of consultation requests directed to the ACS. All subjects were at least 21 years of age with a mean age of approximately 35.8 years; SD = 8.0 years. Graduation from college was the modal academic achievement. Subjects were 98.1% (n = 102) Caucasian (including Hispanic) and 1.9% (n = 2) black. Marital status at the time of evaluation was as follows: 78.9% (n = 82) married, 14.4% single (n = 15), 5.7% divorced (n = 6), and 1% widowed (n = 1). The subject pool contained only two women; historically they have been underrepresented in military aviation. Future research will likely contain greater numbers of female subjects due to their increasing involvement with military aviation. These two women were eliminated from the study due

to their very small number and the MMPI practice of compiling norms based on gender. Morey et al. (8) found significant gender differences in three of their derived scales when they analyzed overlapping items scales and two of their derived scales compared to analyzing non-overlapping items scales. The MMPI does not routinely use race or ethnicity norms.

Procedure

The Aeromedical Consultation Service (ACS) is responsible for conducting aviator medical and psychological/psychiatric evaluations requested by the major command or the surgeon general of the referred aviator's branch of service. Results of the psychological/psychiatric evaluations, excluding neuropsychological (head injury) cases, provided the data for this study. Upon referral, all evaluees completed a standard battery of psychological tests, including the MMPI and the MCMI. Only initial evaluation results have been included in this study to guard against the possibility of spuriously inflated correlations due to multiple test administrations. Only complete and valid testing records were studied. The MMPI protocols were rescored according to the scales developed by Morey et al. (8) for both overlapping and non-overlapping items personality disorder scales. MMPI personality disorder scales were then converted to standard scores for statistical analysis. These MMPI standard scores were not available to the diagnosing psychologist or psychiatrist (who, in any case, conducts an independent assessment) at the time of the subjects' assessments. Two sets of correlation coefficients were generated comparing MMPI (overlapping and non-overlapping items scales) to MCMI personality disorder scales. All statistical procedures used the conservative two-tailed approach.

Of the 104 subjects, 82 were assessed by a psychiatrist. The 82 psychiatrically evaluated subjects' records were reviewed to identify

those subjects diagnosed with a personality disorder or noted to have maladaptive personality traits according to the psychiatrist's diagnostic interview and compilation of other clinical information (excluding psychological testing). Furthering interdiagnoser reliability, all diagnoses were routinely reviewed by a board-certified, senior psychiatrist. Because only one subject was diagnosed with a personality disorder, and because there was a low incidence of any particular maladaptive personality trait noted, inferential statistical analysis was limited. Only the dependent personality *traits* (those not meeting the full diagnostic criteria outlined in DSM-III or DSM-III-R) category approached a sample size sufficient for statistical analysis (using the t-test). Dependent and avoidant personality traits subjects were therefore collapsed into the Cluster C (anxious, fearful) category as defined by DSM-III-R, totaling 10 subjects. Histrionic and narcissistic personality traits subjects were likewise collapsed into the Cluster B (dramatic, emotional, erratic) category, totaling nine subjects. The clusters were then statistically analyzed using multivariate analysis of variance (MANOVA). All statistical comparisons were made among subjects who received no diagnosis or notation of maladaptive personality traits on Axis II upon psychiatric evaluation.

Results

Subjects' raw score means and standard deviations on the MMPI personality disorder scales are presented in Table 1 (overlapping items) and Table 2 (non-overlapping items). To render these nonstandardized results somewhat more meaningful, the first column indicates the number of items for each scale.

Correlations between the MCMI and MMPI personality disorder scales are presented in Table 3 (overlapping MMPI items) and Table 4 (non-overlapping items). An r of 0.38 is statistically significant at the 0.0001 probability level ($p < 0.0001$). Eight of the 11 MMPI scales

positively correlated with their MCMI scale counterparts (seen along the diagonal line) in both conditions (overlapping and non-overlapping items) at $r > 0.38$. Additionally, *PAR* correlated at $r = 0.34$, $p < 0.0005$, in the overlapping items condition and at $r = 0.3$, $p < 0.005$, in the non-overlapping items condition. *ANT* and *CPS* failed to significantly correlate with the corresponding MCMI scales in either condition. *CPS* exhibited a correlation, although statistically insignificant, in the direction opposite than expected. *ANT* correlated best, $r = 0.44$, $p < 0.0001$, with Millon's Passive-Aggressive/ Negativistic scale (scale *8*). Overall, in eight of 11 comparisons, the highest correlations did not occur in the expected comparison. Only *AVD*, *HST*, and *PAG* correlated most highly with their respective counterpart and did so in both the overlapping and nonoverlapping items conditions.

Collapsing narcissistic traits and histrionic traits into Cluster B resulted in no significant differences between means of standardized MMPI scores in either the overlapping items condition or the nonoverlapping items condition. Collapsing dependent traits and avoidant traits into Cluster C resulted in similar, nonsignificant, findings. Only three subjects were psychiatrically noted to have paranoid, schizoid, or schizotypal (Cluster A; odd, eccentric) personality traits; all of these subjects were also noted to have personality traits from one of the other two clusters.

Discussion

The derived correlation coefficients are extremely similar to those achieved by McCann (5) and firmly support the concurrent validity of at least eight of the MMPI personality disorder scales with their corresponding MCMI scales. Similar to McCann's findings, *ANT* and *CPS* failed to achieve significant levels of correlation. The present study, however, did find a stronger correlation between *PAR* and its counterpart

than was the case in McCann. A previous study (4) speculates on possible explanations for the MCMI's inconsistent correspondence with the DSM-III/DSM-III-R when it is used with an aviator population.

The high correlations between some of the noncorresponding MCMI and MMPI personality disorder scales is not at all surprising due to the considerable overlap between personality disorder diagnostic categories, which is recognized by the DSM-III and DSM-III-R, and by the very existence of MMPI *overlapping* items scales.

It is encouraging that the Morey et al. (8) scales remain virtually intact on the MMPI-2 (3). Future studies should examine the relationship between the MMPI-2 and the MCMI-II, particularly in light of the DSM-III-R and any forthcoming diagnostic and statistical manuals of mental disorders.

The accurate diagnosis of personality disorders remains a difficult task. Lack of statistically significant differences between MMPI personality disorder scales of subjects noted to have maladaptive personality *traits*, which is not a formal diagnosis, and subjects who received no such designation is not surprising. The former group apparently lacked all the essential requirements for the psychiatrist to render a formal diagnosis; therefore, subjects would be expected to score lower on any measurement of personality psychopathology. Furthermore, the small number of subjects in each group, even when they are collapsed into clusters, may have limited the ability to detect significant differences between groups. Cluster B was not homogeneous; five of the nine subjects were also noted to possess obsessive-compulsive personality traits, which belong in Cluster C.

Table 1

Means and standard deviations of MMPI with overlapping items scales

Scale	*Number of items*	*Mean*	*Standard deviation*
Schizoid (SZD)	*22*	*6.21*	*3.37*
Avoidant (AVD)	*38*	*9.71*	*6.56*
Dependent (DEP)	*20*	*4.47*	*2.84*
Histrionic (HST)	*20*	*13.42*	*3.36*
Narcissistic (NAR)	*31*	*17.65*	*3.66*
Antisocial (ANT)	*25*	*5.51*	*2.90*
Compulsive (CPS)	*15*	*6.13*	*2.83*
Passive-Aggressive (PAG)	*14*	*3.73*	*2.29*
Schizotypal (STY)	*36*	*6.78*	*4.47*
Borderline (BDL)	*22*	*6.22*	*2.87*
Paranoid (PAR)	*22*	*3.49*	*2.72*

Table 2

Means and standard deviations of MMPI with nonoverlapping items scales

Scale	*Number of items*	*Mean*	*Standard deviation*
Schizoid (SZD)	*13*	*3.32*	*2.24*
Avoidant (AVD)	*14*	*3.81*	*2.63*
Dependent (DEP)	*16*	*3.54*	*2.37*
Histrionic (HST)	*13*	*8.39*	*2.05*
Narcissistic (NAR)	*14*	*7.13*	*2.03*
Antisocial (ANT)	*20*	*3.87*	*2.43*
Compulsive (CPS)	*13*	*5.64*	*2.55*
Passive-Aggressive (PAG)	*14*	*3.73*	*2.29*
Schizotypal (STY)	*15*	*2.09*	*1.73*
Borderline (BDL)	*17*	*3.81*	*2.22*
Paranoid (PAR)	*15*	*1.55*	*1.66*

Table 3

Correlations between MCMI and MMPI with overlapping items scales

Personality Disorder Scales

MCMI	MMPI										
	SZD	AVD	DEP	HST	NAR	ANT	CPS	PAG	STY	BDL	PAR
1 (Schizoid)	0.47	0.62	0.41	-0.53	-0.47	0.04	0.27	0.15	0.59	0.01	0.26
2 (Avoidant)	0.49	0.73	0.54	-0.47	-0.49	0.19	0.50	0.37	0.72	0.24	0.49
3 (Dependent)	-0.03	0.23	0.46	-0.03	-0.07	0.15	0.34	0.17	0.24	0.26	0.24
4 (Histrionic)	-0.56	-0.65	-0.30	0.68	0.59	0.17	-0.23	-0.04	-0.53	0.23	-0.14
5 (Narcissistic)	-0.31	-0.52	-0.50	0.42	0.53	0.09	-0.24	-0.21	-0.44	-0.03	-0.14
6 (Antisocial)	-0.03	-0.23	-0.41	0.17	0.34	0.08	-0.13	-0.05	-0.18	-0.02	-0.02
7 (Compulsive)	0.32	0.12	-0.22	-0.40	-0.28	-0.32	-0.13	-0.25	-0.04	-0.46	-0.26
8 (Passive-Aggressive)	-0.01	0.30	0.42	0.16	-0.01	0.43	0.39	0.41	0.40	0.59	0.53
S (Schizotypal)	0.43	0.65	0.54	-0.44	-0.42	0.24	C.41	0.32	0.66	0.16	0.43
C (Borderline)	0.06	0.40	0.40	0.01	-0.07	0.34	0.54	0.40	0.47	0.55	0.56
P (Paranoid)	0.14	0.09	-0.09	0.04	0.24	0.22	0.28	0.20	0.16	0.21	0.34

.19 = p < .05; .38 = p < .0001 (102 df, two-tailed).

Table 4

Correlations between MCMI and MMPI with nonoverlapping items scales

Personality Disorder Scales

MCMI	MMPI SZD	AVD	DEP	HST	NAR	ANT	CPS	PAG	STY	BDL	PAR
1 (Schizoid)	0.53	0.54	0.36	-0.44	-0.37	0.05	0.25	0.15	0.26	0.18	0.30
2 (Avoidant)	0.59	0.65	0.53	-0.41	-0.33	0.17	0.48	0.37	0.48	0.43	0.43
3 (Dependent)	0.00	0.28	0.51	-0.10	-0.09	0.15	0.36	0.17	0.20	0.28	0.21
4 (Histrionic)	-0.60	-0.55	-0.28	0.64	0.48	0.21	-0.24	-0.04	-0.14	0.04	-0.12
5 (Narcissistic)	-0.41	-0.48	-0.49	0.41	0.47	0.08	-0.22	-0.21	-0.14	-0.10	-0.15
6 (Antisocial)	-0.06	-0.28	-0.41	0.22	0.36	0.05	-0.13	-0.05	-0.06	-0.03	-0.02
7 (Compulsive)	0.24	0.03	-0.21	-0.42	-0.27	-0.35	-0.10	-0.25	-0.15	-0.38	-0.28
8 (Passive-Aggressive)	-0.10	0.29	0.41	0.20	-0.10	0.44	0.35	0.41	0.49	0.61	0.51
S (Schizotypal)	0.49	0.58	0.54	-0.36	-0.33	0.24	0.40	0.32	0.44	0.33	0.39
C (Borderline)	0.18	0.39	0.40	0.00	-0.07	0.33	0.52	0.40	0.52	0.60	0.51
P (Paranoid)	0.14	0.00	-0.04	0.04	0.30	0.16	0.28	0.20	0.27	0.21	0.30

.19 = p < .05; .38 = p < .0001 (102 df, two-tailed).

Table 5

Subjects psychiatrically noted to have maladaptive personality traits compared to subjects without noted maladaptive personality traits

Trait(s) noted	Number (n) of subjects	MMPI overlapping items T score mean, s. d.	MMPI nonoverlapping items T score mean, s. d.	Statistical test	Degrees of freedom (df)	t or F value	Prob. (p) value *
Dependent	6	58.62, 15.9		t-test (t)	46	1.83	0.07
			56.34, 16.1	t-test	46	1.34	0.19
Cluster C	10	56.52, 11.1 sum avoidant		t-test	50	1.81	0.08
(Avoidant +		55.94, 14.5 sum dependent		t-test	50	1.54	0.13
dependent scales of		multivariate		MANOVA (F)	2, 49	1.75	0.18
subjects who were			56.02, 13.7 sum avoidant	t-test	50	1.59	0.12
noted to have either			54.12, 14.6 sum dependent	t-test	50	1.07	0.29
trait)			multivariate	MANOVA	2, 49	1.24	0.30
Cluster B	9	54.57, 5.28 sum histrionic		t-test	49	1.33	0.19
(Histrionic +		54.22, 5.31 sum narcissistic		t-test	49	1.22	0.23
narcissistic scales of		multivariate		MANOVA	2, 48	0.91	0.41
subjects who were			53.66, 6.63 sum histrionic	t-test	49	1.04	0.30
noted to have either			51.85, 5.88 sum narcissistic	t-test	49	0.53	0.60
trait)			multivariate	MANOVA	2, 48	0.54	0.59

*Two-tailed

Above subjects compared to 42 no-personality-disorder traits subjects (standardized MMPI T scores: mean = 50, standard deviation = 10)

References

1. American Psychiatric Association, eds. Diagnostic and statistical manual of mental disorders 3rd ed. Washington, DC: APA, 1980.
2. American Psychiatric Association, eds. Diagnostic and statistical manual of mental disorders 3rd ed., rev. Washington, DC: APA, 1987.
3. Bagby, RM. Status of the MMPI personality disorder scales on the MMPI-2. MMPI News and Profiles, 1990; 1: 8.
4. King, RE. Assessing aviators for personality pathology with the Millon Clinical Multiaxial Inventory (MCMI). Aviat Space Environ Med. 1994; 65· 227-231.
5. McCann, JT. MMPI personality disorder scales and the MCMI: Concurrent validity. J Clin Psychol, 1989; 45: 365-369.
6. Millon, T. Millon Clinical Multiaxial Inventory manual 3rd ed. Minneapolis, MN: Interpretive Scoring Systems, 1983.
7. Millon, T. Manual for the MCMI-II 2nd ed. Minneapolis, MN: Interpretive Scoring Systems, 1987.
8. Morey LC, Waugh MH, & Blashfield RK. MMPI scales for DSM-III personality disorders: Their derivacion and correlates. J Pers Assess, 1985; 49: 245-251.
9. Patterson, JC, Sipes WE, & Marsh, RW. A ten-year review of aviator psychiatric diagnoses and dispositions. Aviat Space Environ Med, In Press.
10. Wiggins, J. Substantive dimensions of self-report in the MMPI item pool. Psychological Monographs, 1966; 80: 22 (whole No. 630).

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